with one another, and each having a respective longitudinal axis that extends generally perpendicular to the first longitudinal axis;

detecting the change in magnetic field due to the displacement of the first and second magnets of said magnet carriage with said Hall effect sensor; and

actuating said switch based on the change in magnetic field detected by said Hall effect sensor.

REMARKS

Claims 1-6, 8-16 and 18 remain in the application for consideration. Reconsideration of the claims is respectfully requested.

The Examiner requested an explanation of why claim 1 is patentable over US 5,086,861 to Peterson, with particular reference to the embodiment shown in Figure 8 of Peterson. Claim 1 requires first and second magnets that are in contact with each other, a feature that is not disclosed or suggested by Peterson. With reference to Figure 8 of Peterson, the magnets 132 and 133 (shown as broken line in Peterson) are separated from one another by a gap. Based on the description of Peterson, it appears that this gap is filled with molded plastic. (See Peterson at col. 7, lines 33-35). As was discussed in the specification of the present application, the contacting relationship between the magnets, as recited in Claim 1, provides a more precise switching point than occurs if the magnets are separated by a gap as shown in Peterson. Hence, claim 1 and its dependant claims 2-6 are patentable over Peterson.

The Examiner also asked for an explanation of why claims 1, 5, 13, 17 and 18 are patentable over U.S. 4,425,557 to Nakamura. Claim 1 requires "a magnet carriage movable along a first longitudinal axis relative to said Hall effect sensor and including ... first and second magnets facing said Hall effect sensor, being in contact with each other, and each having a respective longitudinal axis that extends generally perpendicular to the first longitudinal axis." Similarly, claim 13 requires "displacing a magnet carriage along a first longitudinal axis, the magnet carriage having a first magnet and a second magnet, said first and second magnets positioned with opposite polarities facing a Hall effect sensor, being in contact with one another, and each having a respective longitudinal axis that extends generally perpendicular to the first longitudinal axis." The magnets 1 and 3 in Nakamura do not face the Hall effect sensor 5 as required by claims 1 and 13. Rather, the magnets in Nakamura are stacked upon one another and overly the sensor 5. Additionally, the magnets in Nakamura rotate relative to sensor 5, they do not move along a first longitudinal axis that is generally perpendicular to the longitudinal axes of the magnets as required in claims 1 and 13. Hence, claims 1 and 13 are patentable over Nakamura. Claim 5 depends form claim 1 and claims 17 and 18 depend from claim 13. These claims are patentable over Nakamura for the reasons given above.

The Examiner also asked for an explanation of why claims 7, 9, 13 and 15 are patentable over U.S. 5,365,791 to Padula et al. Claim 7 has been cancelled from the application. Claim 9, which previously depended from claim 7, now depends from claim

10. Claim 10 was indicated as being allowable if rewritten in independent form. Claim 10 has been rewritten as an independent claim and is believed to be patentable. Claim 9 is patentable as depending from a patentable base claim. Claim 13 requires that the first and second magnets are in contact with one another. By contrast, the magnets in Padula et al. are separated by a gap that receives a Hall effect sensor. Additionally, claim 13 requires that the axes of the magnets be generally perpendicular to their direction of travel (i.e., to the axis along which the magnet carriage moves). However, in Padula et al. the axes of the magnets are generally parallel to their direction of travel. Hence, claim 13 and claim 17 which depends therefrom are patentable over Padula et al.

The Examiner also asked for an explanation of why claims 8 and 14 are patentable over Padula et al. in view of U.S. 5,714,918 to Garneyer et al. Claims 8 and 14 depend from claims 10 and 13, respectively, and are patentable over Padula et al. for the reasons set forth above. Garneyer et al. does not address the deficiencies of Padula et al. Moreover, claims 8 and 14 specify further patentable distinctions over the proposed combination. Both of these claims further recite a boot seal between the switch housing and the magnet carriage. Neither of these cited references teach a boot seal. Garneyer et al. shows a seal 11, but this seal is merely an annular seal, e.g., an O-ring, as opposed to a boot seal as required by claims 8 and 14. Hence, claims 8 and 14 are patentable over Padula et al. in view of Garneyer et al.

The Examiner further asked for an explanation of why claims 1-3, 5-9, 11-15 and 17-18 are patentable over Garneyer et al. in view of Peterson. Regarding claim 1, and claims 2, 3, 5, and 6 which depend therefrom, Garneyer et al. fails to disclose or suggest a "magnet carriage movable along a first longitudinal axis relative to said Hall effect sensor and including ... first and second magnets facing said Hall effect sensor, being in contact with each other, and each having a respective longitudinal axes that extends generally perpendicular to the first longitudinal axis." Rather, the switch in Garneyer et al. discloses two actuating members $3a_1$, $3a_2$, each of which carries a respective magnet $7a_1$, $7a_2$. No motivation or suggestion has been identified for combining Garneyer et al. with Peterson in the manner proposed in the Office Action. Moreover, even if Garneyer et al. were combined with Peterson et al., claims 1-3 and 5-6 still define patentable distinctions over the resulting combination. Specifically, as was discussed above Peterson et al. discloses providing a gap between the magnets, as opposed to having the magnets contact each other as required by the claims 1-3 and 5-6. Claims 13-15 and 17-18 are patentable over the combination of Garneyer et al. and Peterson et al. for these same reasons as claims 1-3 and 5-6. Claims 8-9 and 11-12 depend from claim 10, which, has been rewritten as an independent claim and is believed to be allowable. Therefore, claims 8-9 and 11-12 are patentable over Garneyer et al. in view of Peterson et al.

The Examiner also requested an explanation of why claims 7 and 13 and their dependant claims are patentable over Garneyer et al. in view of U.S. 3,041,416 to

Kuhurt. Claim 7 has been cancelled. Claims 8-9 and 11-12 now depend from claim 10, which has been rewritten as an independent claim and is believed to be allowable. Therefore, claims 8-9 and 11-12 are patentable over Garneyer et al. in view of Kuhurt. Claim 13 and its dependant claims require "displacing a magnet carriage along a first longitudinal axis, the magnet carriage having a first magnet and a second magnet, said first and second magnets positioned with opposite polarities facing a Hall effect sensor, being in contact with one another, and each having a respective longitudinal axis that extends generally perpendicular to the first longitudinal axis." As was noted above, Garneyer et al. fails to a magnet carriage that includes two magnets, let alone magnets positioned and oriented in the manner required by claim 13. Nor has any motivation or suggestion been identified that would make it obvious to replace the single magnet of Garneyer et al. with two magnets as shown in Kuhurt. Moreover, even Garneyer et al. were combined with Kuhurt, the magnets would be separated by a non-metallic intermediate layer (see Kuhurt at Figures 1 and 3 and column 3, lines 42-53); they would not contact each other as required by claim 13. Hence, claims 13-18 are patentable over Garneyer et al. in view of Kuhurt.

Finally, claims 12 and 18 are patentable as depending from patentable base claims. In addition, these claims specify at least one additional magnet positioned in the magnet carriage similarly to said first and second magnets. This allows the switch to have multiple switching points and/or an relatively large change in magnetic field with

displacement. This arrangement defines a further patentable distinction over the cited references.

In view of the foregoing, it is respectfully submitted that the pending claims define allowable subject matter. If anything remains in order to place the present application in condition for allowance, the Examiner is invited to contact the undersigned at the telephone number listed below.

Respectfully submitted,
McANDREWS, HELD & MALLOY, LTD.

Date: October 25, 2002

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APPENDIX

Version with Markings to Show Changes Made

1. A Hall effect switch comprising:

a switch housing;

a Hall effect sensor positioned inside said switch housing; and

a magnet carriage positioned inside said switch housing, said magnet carriage movable along a first longitudinal axis relative to said Hall effect sensor and including a first magnet and a second magnet, said first ~~magnet and said~~ and second magnets ~~positioned~~ facing said Hall effect sensor, being ~~and~~ in contact with each other, and each having a respective longitudinal axis that extends generally perpendicular to the first longitudinal axis~~,~~;

said Hall effect sensor responsive to the positional displacement of said first and second magnets relative to said Hall effect sensor.

8. The Hall effect switch of claim ~~7~~ 10 further comprising a boot seal between said switch housing and said magnet carriage.

9. The Hall effect switch of claim ~~7~~ 10 further comprising a return spring for biasing the positional displacement of said magnet carriage.

10. A Hall effect switch comprising:

a switch housing;

a Hall effect sensor positioned inside said switch housing;

a magnet carriage positioned inside said switch housing, said magnet carriage movable relative to said Hall effect sensor and having a first magnet and a second magnet, said first magnet and said second magnet positioned with opposing polarities facing said Hall effect sensor; and

~~The Hall effect switch of claim 7 further comprising~~

a clicker ball and a clicker ball aperture, said clicker ball being displaced from a non-actuated position to an actuated position by the positional displacement of said magnet carriage and thereby emitting a perceivable clicking indication;

said Hall effect sensor responsive to the positional displacement of said first and second magnets relative to said Hall effect sensor.

11. The Hall effect switch of claim ~~7~~ 10 wherein said first and second magnets are positioned in contact with each other.

12. The Hall effect switch of claim ~~7~~ 10 further comprising at least one additional magnet in said magnet carriage positioned similarly to said first and second magnets.

13. A method for contactless switching in a switch housing including a Hall effect sensor and a magnet carriage, said method comprising:

mechanically displacing a magnet carriage along a first longitudinal axis, the magnet carriage having a first magnet and a second magnet, said first ~~magnet and said~~

and second magnets positioned with opposite polarities facing a Hall effect sensor, being in contact with one another, and each having a respective longitudinal axis that extends generally perpendicular to the first longitudinal axis;

detecting the change in magnetic field due to the displacement of the first and second magnets of said magnet carriage with said Hall effect sensor; and

actuating said switch based on the change in magnetic field detected by said Hall effect sensor.